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Monday
April 16, 1979

Part II

Department of Energy

Weatherization Assistance Program for Low-Income Persons; Proposed Amendments

DEPARTMENT OF ENERGY

[10 CFR Parts 420, 440]

Weatherization Assistance Program

AGENCY: Department of Energy.

ACTION: Proposed Rule.

SUMMARY: The Department of Energy (DOE) proposes to amend the regulations for the program of weatherization assistance for low-income persons in order to carry out the requirements of Section 231(b)(1) of the National Energy Conservation Policy Act, Pub. L. 95-619, 92 Stat. 3224 *et seq.* The proposed changes would revise and simplify the approach to weatherization currently required by Project Retro-Tech, a four volume conservation paper issued by the Department of Energy. The proposed changes would require a State to develop, as part of a State plan, a list of weatherization measures, by building type, ranked in order of cost-effectiveness. Upon approval by the DOE Regional Representative, a State would be required to include the list in copies of Project Retro-Tech to be used by program operators in the State.

Project Retro-Tech is being revised to provide a calculation method for the evaluation of the cost-effectiveness of weatherization measures. Program operators would be required to use either the list developed by the State to determine which measures to use to weatherize a dwelling unit or to complete the Project Retro-Tech calculation method for a dwelling unit to determine the measures to be employed to weatherize the dwelling unit. The proposal also amends the administrative provisions to require grantees to comply with the requirements of the DOE Assistance Regulations 10 CFR Part 600.

DATES: Comments must be received by May 16, 1979, request to speak at the hearing by 4:30 p.m., April 20, 1979; speakers will be notified by April 23, 1979; written statements of speakers by April 26, 1979. A public hearing will be held at 9:30 a.m., April 30, 1979. The public hearing will be held in Room 3000A, 1200 Pennsylvania Avenue, NW., Washington, D.C.

ADDRESSES: Send comments and request to speak to: Margaret Sibley, Office of Conservation and Solar Applications, Room 2221C, Department of Energy, 20 Massachusetts Avenue, NW., Washington, D.C. 20545, re: Weatherization Assistance for Low-Income Persons Regulations (Docket No. CAS-RM-75-503).

FOR FURTHER INFORMATION CONTACT:

Mary M. Bell, Director, Office of Weatherization Assistance, Department of Energy, Room 4121, 20 Massachusetts Avenue, NW., Washington, D.C. 20545, (202) 376-9481.

Richard F. Kessler, Office of General Counsel, Department of Energy, Room 3228, 20 Massachusetts Avenue, NW., Washington, D.C. 20545, (202) 376-9297.

Margaret Sibley, Department of Energy, Room 2221C, 20 Massachusetts Avenue, NW., Washington, D.C. 20545, (202) 376-1651.

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I. Introduction

The Department of Energy ("DOE") administers a State grant program of weatherization assistance for low-income persons under the Energy Conservation in Existing Buildings Act of 1976 ("Act"), 42 U.S.C. 6851 *et seq.* DOE proposes to amend the regulations for the program (10 CFR Part 440) to meet certain requirements of Section 231(b)(1) of the National Energy Conservation Policy Act ("NECPA"), 92 Stat. 3224 *et seq.* On February 16, 1979, DOE published a Notice of Proposed Rulemaking in the **Federal Register** (44 FR 10348) proposing changes to accommodate all NECPA amendments to the Act except section 231(b)(1). The February proposal noted that—

"DOE excepts to propose further amendments to respond to the NECPA's provisions concerning procedures for determining the optimum set of cost-effective measures, within the cost guidelines of the program, for weatherizing each dwelling unit under the program."

Today's proposal is in response to the requirements of section 231(b)(1) of NECPA to develop such "a set of procedures." DOE proposes to amend § 440.14(b) to require a State, as part of the State weatherization program plan, to develop, by building type, a list of weatherization measures ranked in order of cost-effectiveness. DOE further proposes to amend § 440.15(a) to require a State to develop and publish procedures to assure that program operators are provided with suitable copies of the list. To accomplish this, DOE is revising the four volumes which comprise Project Retro-Tech. The procedure to be followed by a State to evaluate cost-effectiveness is contained in the revised Job Book, one of the four volumes, which is published as Appendix A to this preamble.

DOE has made technical and additional corrections to the other three volumes of Project Retro-Tech to conform to the changes contained in today's proposal. Copies of each of the revised Project Retro-Tech volumes may be obtained by contacting the following DOE regional personnel:

REGION I

Edward Finigan, Department of Energy, 150 Causeway Street, Room 700, Boston, Massachusetts 02114.

REGION II

Barbara Merritt Butler, Department of Energy, 26 Federal Plaza, Room 3206, New York, New York 10007.

REGION III

Rollie Clifton, Department of Energy, 1421 Cherry Street, Philadelphia, Pennsylvania 19102.

REGION IV

Ron Easton, Department of Energy, 1655 Peachtree Street, N.E., Atlanta, Georgia 30309.

REGION V

Tom Sanders, Department of Energy, 175 West Jackson Boulevard, Room A-333, Chicago, Illinois 60604

REGION VI

Chuck Royston, Department of Energy, P.O. Box 35228, Dallas, Texas 75235.

REGION VII

Beatrice Chabie, Department of Energy, 324 East 11th Street, Kansas City, Missouri 64106.

REGION VIII

Tom Stroud, Department of Energy, P.O. Box 26247-Belmar Branch, Lakewood, Colorado 80226.

REGION IX

Fred King, Department of Energy, 111 Pine Street—4th Floor, San Francisco, CA 94111.

REGION X

Tom Haller, Department of Energy, 1923 Federal Building, Seattle, Washington 98174. Or:

Mary M. Bell, Director, Office of Weatherization Assistance, Department of Energy, 20 Massachusetts Avenue, NW., Washington, D.C. 20545.

This proposal would also add a new § 420.2(a)(9) to require grantees to use the DOE Assistance Regulations, 10 CFR Part 600, in the administration of a grant under this program.

II. Discussion of Proposed Changes

A. *Set of Procedures.* Section 231(b)(1) of NECPA requires DOE to promulgate procedures to determine the optimum set of cost-effective weatherization measures to be installed in each dwelling unit. These procedures are to be applied to each dwelling unit, be within cost guidelines (10 CFR 440.16) for the weatherization program, and take into consideration the following factors: (1) The cost of weatherization materials, (2) variation in climate, and (3) the value of energy saved by application of the weatherization material. The proposed changes to Project Retro-Tech are designed to reflect the requirements of Section 231(b)(1) of NECPA and to simplify the procedures for identifying cost-effective measures for particular dwelling units.

Under the present requirements of Project Retro-Tech, the program operator must complete a 12-page data questionnaire and analysis for each dwelling unit weatherized. Today's proposal would modify this procedure. Under proposed § 440.15(b)(3), the State, as part of the State plan, would calculate the cost-effectiveness of weatherization measures and rank them by priority for different types of dwelling units by using the procedures and tables in the revised Job Book. The State would select standard types of dwelling units representative of the types of units to be weatherized under the State plan. The State would also determine the fuel prices and installation costs to be used in the calculation. The Job Book identifies specific weatherization measures for evaluation. However, the State may evaluate other weatherization measures if it chooses to do so. A list of weatherization measures ranked in order of cost-effectiveness is developed for each standard dwelling type and submitted to DOE for approval as part of the plan.

Proposed § 440.15(a) would require the State to develop procedures to assure that the list of measures, after approval by the Regional Representative, is included in copies of Project Retro-Tech which are furnished by the State to subgrantees. These procedures should insure that program operators within the State have sufficient copies of the Revised Project Retro-Tech which must include the State's list of weatherization measures as well as fuel prices and installation costs. In addition, the procedures should enable program operators to understand the relationship of the list to different types of dwelling units. DOE believes this process, by assigning appropriate roles to the State and program operators, will ensure that the optimum set of cost-effective measures is installed.

Program operators are encouraged but not required to employ the State list of weatherization measures. If a program operator finds the list inappropriate for a dwelling unit, the program operator may use the Job Book to determine other weatherization measures to be used to weatherize the dwelling. Situations may arise where a specific dwelling unit does not fit into a standard building type. Also, even if a dwelling unit conforms to a standard building type, application of the preselected weatherization measures may not correct the weatherization problems observed upon an on-site inspection. However, if the program operator chooses not to use the State developed list for a dwelling unit, Part II B of the Job Book must be completed for that dwelling unit.

Experience with the program has shown that the unrevised Retro-Tech Job Books are sometimes not being correctly used by program operators and are not being completed, on a significant number of occasions. The principal problem was that program operators could not complete the detailed calculations to estimate fuel savings. At the same time, DOE has observed that, when properly filled out, the Job Books prescribe similar weatherization measures for similar buildings. For these reasons, DOE believes the evaluation of weatherization measures for standard types of dwellings, of which large numbers exist in an area, can be done most effectively by the State rather than by each program operator, dwelling unit-by-dwelling unit, in the field. In addition, considerable time and effort could be saved by preselecting the weatherization tasks and providing the opportunity to modify the list for a specific dwelling unit, if necessary. This approach would eliminate the 12-page on-site calculation currently being performed for each dwelling unit by program operators.

The proposal does not change the current requirement that each dwelling must be inspected to determine the appropriate weatherization measures to be used, but, under the proposal, the priority of the weatherization measures would be predetermined.

Because these new procedures are a major departure from the present program, the public is invited to comment on their desirability and workability. Comments are especially sought on the extent to which States and subgrantees should be given flexibility in determining which measures and procedures to use.

B. *The Project Retro-Tech Job Book.* This proposal would alter the Project Retro-Tech Job Book so that a State could calculate the optimum set of cost-effective weatherization measures to be used by weatherization projects covered by its State plan. Fuel savings calculations are made by the State not by the program operators except where the program operator does not use the list prepared by the State. A simple cost-benefit calculation is provided to analyze the cost-effectiveness of each measure. The Job Book identifies sources of heat loss and measures required to reduce the heat loss. The Job Book contains step-by-step procedures to calculate a cost-effectiveness ratio for each measure. This ratio is the total cost divided by the lifetime savings due to the measure. Measures are to be ranked by the State in the order of their cost-effectiveness ratios in the Summary Table for Priority Rating.

DOE believes the total cost must be analyzed to effectively compare different measures. For example, the material costs for cellulose insulation do not accurately reflect the actual cost because installation involves a substantial expense for labor and equipment. Although labor costs are generally not paid with program funds, DOE believes that this cost, which is principally paid by other Federal programs, must also be considered in any meaningful analysis of cost-effectiveness. Accordingly, to complete the Summary Table for Priority Rating, the State is to use an installation factor in order to derive the estimated total cost for each weatherization measure installed. The installation factor is calculated by dividing the total costs (installation and material costs) by the material costs. Installation costs include the amounts to be spent for on-site labor and equipment rentals. Each State is to estimate the installation factors by weatherization measure for each

standard dwelling unit type and to secure approval by the DOE Regional Representative of the factors. States can use either actual data from representative buildings recently weatherized or standard references, like "Building Cost Construction Data" by R. S. Means, to compute these factors.

The State must also estimate the appropriate fuel cost per heating unit in order to calculate the expected lifetime savings for the particular measures. The unit cost of fuel should reflect current prices reasonably estimated to reflect statewide experience.

The Job Book does not provide a formula to evaluate each weatherization material identified in the program regulations. However, the Job Book may be used to evaluate any weatherization measure provided DOE has prescribed a standard in Appendix A for the weatherization material which would be used.

The Job Book does not require the evaluation of all weatherization measures which use weatherization materials. Experience with the program indicates that certain weatherization measures are always effective and therefore should always be given the highest priority. For this reason, DOE has detemined that highest priority be given to caulking and weatherstripping of doors and windows; materials used to reduce infiltration through the building envelope; duct insulation if hot air ducts are located in unheated areas; and wrapping a hot water heater with external insulation.

For example, evaluating the precise savings resulting from wrapping a hot water heater with insulation is somewhat difficult because savings vary with water heater size, temperature setting, location of the heater within the building and with climate zone. However, in general the savings obtained by insulation are in the order of 0.5 heating units per year per gallon of heater capacity. Moreover, the procedure is very cost effective, generally saving its entire cost in less than one season. For example, an 80 gallon heater, with the normal 1 inch or so of insulation included in its jacket, when set at 150°F, will lose approximately 60 heating units per year to its surroundings. Insulating with R–11 will reduce this by 35–40 heating units, that is, will save approximately 1000 kwh per year, approximately $40. A kit to insulate the heater will cost less than $20 or if fiberglass roll insulation is used the cost will be less than $6—both very cost-effective.

The same reasoning applies to insulation of hot air ducts passing through unheated areas. Evaluating the precise heat loss is also difficult as systems circulate air at different temperatures and different velocities, and the temperature of unheated areas varies tremendously. However, the surfaces of uninsulated ducts are so hot that heat loss is substantial. Duct insulation will usually pay for itself in less than one season in all but the very mildest climates. For example a duct carrying 130°F air in a heating system which runs 1000 hours per year may lose the equivalent of one heating unit per square foot of duct. Duct insulation of R–6 would save 80–90% of this loss for a one time cost of around $1 per sq. ft. if special duct insulation was used, and as little as 20¢ per sq. ft. if fiberglass rolls were used.

Certain weatherization materials must be considered by the State in the Job Book. The sources of heat loss analyzed by the Job Book are uninsulated ceilings, partially insulated ceilings, exposed floors, uninsulated building perimeters, uninsulated floors, uninsulated walls and single glass windows. The weatherization materials which must be analyzed in the Job Book consist of ceiling, attic, wall and floor insulation, storm windows and skirting. DOE has determined that these weatherization materials have varying degrees of cost-effectiveness, and therefore their evaluation by the State is required for the State plan.

Both vapor barriers and items to improve attic ventilation are necessary for and cannot be separated from the proper installation of other materials so that a separate cost-effectiveness calculation is unwarranted. Vapor barriers are not normally purchased separately except for new construction, and will generally be only ancillary to other weatherization materials, e.g. as foil or Kraft backing on roll insulation. Vapor barriers are not considered in the Job Book as a weatherization measure, but their function, to protect insulation and structural materials, is discussed in other parts of Project Retro-Tech. Similarly, attic vents are an ancillary item and serve to protect the insulation from damage due to moisture condensation. Its value cannot be calculated, but its purpose and function are discussed elsewhere in Project Retro-Tech.

No analysis is made of furnace efficiency modifications and heat absorbing or heat reflective window and door materials because the program, at this time, contains no standards for these weatherization materials. DOE is developing standards for these materials and expects to introduce these standards into the program in the future and then make necessary changes to Project Retro-Tech.

Adding storm windows to an existing window is generally less costly than removing the whole window and replacing it with a double glazed unit, so DOE has primarily considered storm windows in the Job Book. A typical installed price for storm windows is around $2 per square foot while a double glazed window unit will generally cost over $5 per square foot. Both will do essentially the same thing, i.e. increase the overall R value to around 2 and cut infiltration, but storm windows normally do it for much less cost.

Justifying the use of storm doors as a cost-effective weatherization measure is often difficult in the normal case. If the regular door is in reasonable shape, infiltration losses can be eliminated at low cost with weatherstripping, so the only saving made by the storm door is on conduction losses. For a typical 3'.0" x 6'8" doorway, by increasing the overall R value from approximately 2 to approximately 3, a storm door will save only a matter of 6 or 7 heating units per year even in a severe climate such as that of Maine. Even allotting a 20 year life to the door, with the good fortune of no glass replacement during that time, the door only breaks even as a weatherization measure. In milder climates or with fuels costing less than 50¢ per heating unit, only the lowest cost storm door is likely to save its cost during its life. However, if the existing door cannot be draft proofed, a storm door is cheaper than replacing the existing door and could be justified on an individual basis by the program operator by completing the Job Book. The same justification might be made for storm doors on electrically heated homes, i.e. those with a high unit fuel cost, in northern Minnesota or in Alaska, but DOE believes that even in those situations storm doors would have a much lower priority than the standard measures considered in the Job Book.

No analysis is required for clock thermostats which may be purchased as a weatherization material. Clock thermostats when properly used are cost-effective. However, DOE is concerned that, although clock thermostats, when properly used, will reduce fuel costs, the device will not increase the warmth of dwelling units. DOE, accordingly, believes that a clock thermostat ought not to be given the same priority as an item which can both reduce fuel costs and provide greater warmth. DOE is not proposing any major changes in the heat calculation

method presently used. The approximate R values use in the current Job Book are retained unchanged. The present use of District Heating Factors is also retained.

As stated above, DOE believes that State and program operators should have the flexibility to include in the priority calculation any material for which DOE has prescribed a standard in Appendix A of the regulation. The revised Job Book has instructions for adding additional measures into the calculation. For example a State may desire to include storm doors. While preliminary analysis indicates that this measure is generally less cost-effective than other measures, DOE is not prepared at this time to preclude its use as a priority weatherization measure.

The public is encouraged to comment on the treatment of these weatherization measures.

C. *Alternative Approaches to Project Retro-Tech.* Proposed § 420.17 require the exclusive use of the approaches to weatheriztion contained in Project Retro-Tech. At present, § 420.17(d) permits the use of approaches to weatherization not contained in Project Retro-Tech when requested by a grantee or subgrantee if approved by the Regional Representative upon a finding that such approaches meet or exceed the approaches contained in Project Retro-Tech. According to the preamble to the final rule, this opportunity to use alternative approaches was developed "to encourage local initiative, while at the same time disharging [DOE's] statutory obligation to prescribe standards for weatherization techniques." 42 FR 27902 (June 1, 1977).

Section 231(b)(1) of NECPA now requires DOE to develop "a set of procedures to determine the optimum set of cost-effective procedures." Moreover, NECPA further provides that the approach to weatherization prescribed by DOE in accordance with Section 413(b)(2)(A) of the Act will be utilized by the Secretary of Agriculture and the Director of the Community Services Administration (CSA).

DOE has initially concluded upon the basis of two years of program experience and after coordination with the Secretary of Agriculture and the Director of CSA that one set of procedures would most effectively carry out the intent of Congress and maximize the benefits and minimize the costs of conducting weatherization for the benefit of low-income persons. DOE believes that Project Retro-Tech, as revised, incorporates sufficient flexibility to tailor the program to fit conditions at the State and local levels, and DOE is therefore proposing its use exclusively.

D. *Coordination with Federal Agencies.* DOE has coordinated these proposed changes with the Secretary of Housing and Urban Development, Secretary of Health, Education and Welfare, the Secretary of Agriculture, the Director of the National Bureau of Standards in the Department of Commerce, and the Director of CSA. Discussions were held in January, 1979 with agency representatives of these officials. Drafts of the proposed Project Retro-Tech manual and procedures were provided to these agencies, and their comments were used in preparing this proposed rule.

E. *Coordination with the DOE Residential Conservation Service Program.* On March 19, 1979, DOE published in the **Federal Register** a Proposed Rule for the Residential Conservation Service (RCS) Program, (44 FR 16546–16979). The RCS program is required by Title II, Part 1 of NECPA. Its purpose is to encourage the installation of energy conservation measures, including renewable resources measures (e.g. solar), in existing houses by residential customers of larger gas and electric utilities and home heating suppliers.

Under the RCS proposed rule, utilities would be required to offer program announcements describing the RCS program to each of their residential customers. These utilities would also be required to make available to those customers lists of contractors and suppliers of energy conservation measures, as well as lending institutions that will finance energy conservation measures. The residential customers would be able to obtain "energy audits" of their homes from these utilities. Each audit would identify with respect to that house costs and savings involved in the installation of energy conservation measures appropriate for a house of that category in that climatic region. Finally, the larger utilities would offer to arrange the installation and financing of whatever suggested measures the customer desired. Home heating suppliers may offer the RCS program to their customers if the Governor includes them in the State plan. The measures installed under the program would have to meet the material and installation standards set forth in the rule.

The States are asked to develop plans for implementation and enforcement of the RCS program. These plans are due to DOE within six months of the publication of a final rule, now scheduled for September 1979. Implementation by utilities is expected in the latter half of 1980.

There are important differences between the RCS and the weatherization programs. RCS is to provide consumers with information; the weatherization program is to finance services to weatherize units. RCS does not prescribe the procedures for or require the determination of the optimum set of measures to be applied to each dwelling unit; the weatherization program sets a coordinated Federal approach by establishing the procedures to be used by States. RCS covers all households served by participating utilities; the weatherization program applies only to low-income families. Because of these fundamental statutory differences in the two programs, DOE does not believe it feasible to unify the two. However, DOE believes that coordination is essential wherever possible. In particular, we are concerned that the services which a low-income family receives from each program are consistent and not conflicting. DOE seeks comments on how this might be best accomplished.

III. Opportunity for Public Comment

A. *Written comment procedures.* Interested persons are invited to participate in this rulemaking by submitting data, views or arguments with respect to the proposals set forth in this notice to Ms. Margaret Sibley, Office of Conservation and Solar Appliccations, Room 2221C, Department of Energy, 20 Massachusetts Avenue, NW., Washington, D.C. 20545.

Comments should be identified on the outside of the envelope and on documents with the designation "Weatherization Assistance for Low-Income Persons Regulations (Docket No. CAS–RM–79–503)." Fifteen copies should be submitted. All comments received by May 16, 1979, before 4:30 p.m., and other relevent information, will be considered by DOE before final action is taken regarding the proposed regulations.

Any information or data considered by the person furnishing it to be confidential must be so identified, and one copy submitted in writing. DOE reserves the right to determine the confidential status of the information or data and to treat it according to its determination.

B. *Public hearing.* DOE has determined to have one national public hearing on this proposal. It will be held at 9:30 a.m., on April 30, 1979, in Room 3000A, 1200 Pennsylvania Avenue, NW., Washington, D.C.

Any person who has an interest in tis proceeding or who is a representative of a group of persons that has an interest in this proceeding may make a written request for an opportunity to make an oral presentation. Such a request should be directed to Ms. Margaret Sibley at the address given at the beginning of this preamble and must be received before 4:30 p.m., on April 20, 1979. A request may be hand-delivered to Ms. Sibley's office between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday. Requests should be marked as for written comments, with the additional notation "Request to Speak".

The person making the request should briefly describe the interest concerned, if appropriate, state, why she or he is a proper representative of a group of persons that has such an interest, and give a concise summary of the proposed oral presentation and a phone number where she or he may be contacted through April 30, 1979. Each person selected to be heard will be notified by DOE before 4:30 p.m., April 23, 1979. Each person selected to be heard must bring 15 copies of her or his statement to the hearing.

In the event any person wishing to testify cannot provide 15 copies. alternative arrangements can be made with the hearing coordinator in advance of the hearing by so indicating in the letter requesting an oral presentation or by calling Ms. Sibley at (202) 376–1651.

C. *Conduct of Hearing.* DOE reserves the right to select the persons to be heard at the hearing, to schedule their respective presentations and to establish the procedures governing the conduct of the hearing. The length of each presentation may be limited, based on the number of persons requesting to be heard.

A DOE official will be designated to preside at the hearing. This will not be a judicial or evidentiary-type hearing. Questions may be asked of speakers only by those conducting the hearing, and there will be no cross-examination of persons presenting statements. Any decision made by DOE with respect to the subject matter of the hearing will be based on all information available to DOE. At the conclusion of all initial oral statements at the hearing, each person who has made an oral statement will be given the opportunity if she or he so desires, to make a rebuttal statement. The rebuttal statements will be given in the order in which the initial statements were made and will be subject to time limitations.

Any person wishing to ask a question at the hearing may submit the question, in writing, to the presiding officer. The presiding officer will determine whether the question is relevant, and whether the time limitations permit it to be presented for answer.

Any further procedural rules needed for the proper conduct of the hearing will be announced by the presiding officer.

A transcript of the hearing will be made and the entire record of the hearing, including the transcript, will be retained by DOE and made available for inspection at the DOE Freedom of Information Office, Room GA152, 1000 Independence Avenue, SW., Washington, D.C. between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday. Any person may purchase a copy of the transcript from the court reporter.

IV. Environmental and Significance Review

Pursuant to section 7(a)(1) of the Federal Energy Administration Act of 1974, as amended, 15 U.S.C. 766(a)(1), a copy of this notice was submitted to the Administrator of the Environmental Protection Agency for his comments concerning the impact of this proposal on the quality of the environment. The Administrator had no comments.

Pursuant to the National Environmental Policy Act of 1969, as amended ("NEPA"), 42 U.S.C. 4321 *et seq.*, DOE is preparing a supplement to the environmental assessment ("EA") prepared in connection with the weatherization program regulations proposed in the **Federal Register** on April 1, 1977 (42 FR 17470), and finalized in the **Federal Register** on June 1, 1977 (42 FR 27899). Notice of that EA, its availability, and the negative determination made in connection with it was published in the **Federal Register** on March 31, 1977 (42 FR 17168). The supplement updates the original EA and evaluates the impacts of the legislative amendments pursuant to Title II, Part 1 (Residential Energy Conservation) and Title II, Part 2 (Weatherization Grants for the Benefit of Low-Income-Families) of the NECPA. This NEPA review, as well as any further review deemed necessary on the basis of the supplement to the EA, will be completed and considered prior to the promulgation of this rule.

As mentioned in the supplementary environmental assessment, a potential health risk may exist for occupants of certain weatherized structures which have higher than normal concentrations of radon. This potential health risk is associated with all DOE energy conservation programs that reduce substantially the number of air changes per hour in buildings. DOE will look at the question of radon and any other substances posing potential health risks to determine if specific standards are required to mitigate these potential risks.

In accordance with DOE Order 2030, DOE considered the effects of the NECPA amendments and determined that they are significant for purposes of Executive Order 12044. While the Executive Order directs that significant rules receive a 60-day public comment period wherever possible, DOE has determined that such a period would substantially delay DOE's ability to put into operation changes mandated by NECPA which are important to the program's operation, such as the procedures for determining the optimum cost-effective measures to eligible dwelling units.

Accordingly, the Deputy Secretary has determined that a 30-day comment period would best serve the public interest by providing the opportunity to implement, if appropriate, the proposed changes in the shortest practicable time, consistent with a sufficient period for comments.

The DOE has determined that this regulation will have no major economic impacts requiring a regulatory analysis.

(Energy Conservation in Existing Buildings Act of 1976, as amended, 42 U.S.C. 6851 *et seq.*; Department of Energy Organization Act, 42 U.S.C. 7101 *et seq.*)

In consideration of the foregoing, it is proposed to amend Part 440 of Chapter II of Title 10, Code of Federal Regulations, as set forth below.

Issued in Washington, D.C., April 6, 1979.

Omi G. Walden,
Assistant Secretary, Conservation and Solar Applications.

Appendix A to the Preamble

The proposed revised Project Retro-Tech Job Book is reproduced below to assist individuals in commenting on this proposed rule. The proposed revisions would replace Project Retro-Tech Home Weatherization Job Book (Federal Energy Administration Conservation Paper Number 28B). Revisions to Conservation Papers Number 28B, C and D are not included here. These changes will conform these documents to the documents displayed here. Copies of the revised Project Retro-Tech may be obtained by interested persons as noted above in this preamble.

BILLING CODE 6450-01-M

Project RetroTech

REFERENCE NO. ____

HOME
WEATHERIZATION
JOB BOOK FOR
PRIORITY SETTING

_____
Street Address (or Building Type if for Sample evaluation)

_____
Town (or Area if for sample calculation)

This revised Job Book replaces the original Retrotech Job Book and is used in much the same way. Additional information is developed which allows priority of various weatherization measures for a building to be determined as required by the National Energy Conservation Policy Act.

The booklet is also intended to be used for determining costs of weatherization measures and consequent fuel savings for sample buildings of frequently occurring types in an area, e.g. ranch houses, colonials, row houses, etc. to establish a priority listing which will hold for all similarly constructed buildings in the area. This procedure eliminates the necessity for using a Job Book for every building where many buildings of a particular type are of similar construction.

Home Evaluation

Inspection by _____ Date _____

Calculation and Priority Sections by _____ Date _____

This revised Job Book replaces the original Retro-Tech Job Book and specifies steps States and program operators must follow to comply with the weatherization assistance for low-income persons program ("Program"). As part of the State plan, the State shall develop a list, by type of building, of measures ranked by priority to be used by program operators. The list shall be developed in accordance with the calculations contained in this Job Book. The list and calculations will be reviewed by the DOE Regional Representative. Upon approval, the State will insert the list into the Building Check and Job Order Sheet and distribute the Sheet to all program operators for their use.

The program operator shall fill out the Building Check and Job Order Sheet in performing an on-site inspection to determine which measures to use to weatherize a dwelling unit and to identify the weatherization materials and work to be undertaken. If the design of a dwelling unit makes the use of the list inappropriate, the program operator shall complete the calculations in the Job Book to determine the most cost-effective set of measures to be used to weatherize the dwelling unit.

PART I Selection of Weatherization Measures

A. Using a Job Book for Evaluation of Building Types

(1) Types of buildings

The State shall identify types of buildings which reasonably represent the majority of dwelling units eligible for weatherization under the Program. Types of buildings may be ranch houses, colonial, row houses, etc. The State has the option to identify building types to cover the whole State or cover subareas of the State. For example, there may be a ranch house type for the southern and another ranch type for the northern parts of the State. Individual dwelling units not covered by a category will be evaluated in accordance with Part II, B of this Job Book.

(2) Sample of buildings

Once building types are set, the State shall select a sample of buildings by type for which priority setting calculations will be made. There is no limit on the number of buildings to each category sample. Given available program and other information, the sample may be only a few dwelling units that are reasonably representative of the category. The size of the building does not affect the results obtained as the weatherization priorities are set on the basis of cost per heating unit saved. However, the construction of the building should be typical of the group.

The State is then to calculate for each dwelling unit the cost-effectiveness of each weatherization measure, subject to prioritization, using calculation procedures contained in this Part I.

(3) Calculation procedures for weatherization materials to be ranked

There are six calculation procedures to be followed:

a. Description of Building (pages 15-16)

b. Heat Losses by Conduction through Uninsulated Ceilings (page 17)

c. Heat Losses by Conduction through Partially Insulated Ceilings (page 18)

d. Heat Losses by Conduction through Floors (page 19)

e. Heat Losses by Conduction through Uninsulated Walls (page 20)

f. Heat Losses by Conduction and Infiltration through Single-Glass Windows (page 21)

When the sample is identified an inspection will be necessary to fill in data sections of the Job Book marked "Fill in at Job Site". These data are found in calculation procedures a, b, d and e.

(1) Description of the Building (pages 15-16)

a. Enter into the form sketches of the various views of the building.

b. Enter in the appropriate District Heating Factor from the map provided on page 25. If the type of the building is to be applied to an area containing several District Heating Factors, use the average of the factors. If this variation in heating factors would result in different rankings, division of the building type into two or more categories covering different areas would be appropriate.

c. Enter in fuel prices per unit of fuel. The price should be a reasonable approximation of the price presently charged to occupants of dwellings in the category.

(2) Heat Losses by Conduction through Uninsulated Ceilings (page 17)

a. From Table 1 on page 22 of the Job Book, obtain the R value for each material in the ceiling (or roof, where appropriate). Add these R values to obtain a composite R value for ceiling (or roof). Round off the value to the nearest tenth of unit.

b. Enter ceiling area and District Heating Factor and determine the heating units now required due to losses through the ceiling.

c. In a similar manner, determine the heating units which would be required if the ceiling were insulated to have an R value appropriate to the area.

The appropriate amount of insulation for a ceiling depends on climate, fuel prices and insulation costs. Check the current DOE recommendations on maximum R value for the area. These R values will be reviewed each year to keep the recommendations up to date.

d. Subtract to determine the potential heating savings and enter at the bottom of the page.

(3) Heat Losses by Conduction through Partially Insulated Ceilings (Page 18)

Some ceilings, particularly in Northern Tier areas, may have had some insulation installed when the house was built or some may have been added since. Though the typical building which is evaluated may not have any ceiling insulation, some houses of the same type may. In cases like this, although the primary savings have been made, it may be worthwhile adding more insulation. This page is used to determine if this is so.

a. Determine the heating units required by a ceiling like the one in the typical house if it were insulated to R-10 (that is if it had approximately 2-3 inches of insulation).

b. In a similar manner, determine the heating units which would be required if the ceiling were insulated to have an R value appropriate to the area.

c. Subtract to determine the potential heating savings and enter at the bottom of the page.

(4) Heat Losses by Conduction through Floors (page 19)

a. Enter the floor area, appropriate exposure factor, District Heating Factor and R value and determine the heating units now required due to losses through the floor.

b. In a similar manner check the potential heating units based on a floor exposure factor of 0.5, provided draft proofing below the floor is practical.

c. If insulating the perimeter of the crawl space or basement is practical, determine the potential heating units if the floor exposure factor were reduced to 0.3 in this way.

d. If insulating the perimter is not practical due to probable wetting of the insulation or need for underfloor ventilation, insulating the whole floor may be the only possible treatment. Determine the potential heating units with a minimum floor R-15.

e. Subtract the three different potential heating unit figures from the heating units now required and enter the figures in the boxes at the bottom of the page.

(5) Heat Losses by Conduction through Uninsulated Walls (Page 20).

If walls are already partially insulated, e.g. with a 2-inch blanket of insulation in a 4-inch cavity, it is usually impossible to add insulation to the wall. Even if the typical house has partial insulation this page might be completed in case some examples of the type are completely uninsulated.

At the present time, only frame walls are normally being insulated in the weatherization program, as a suitable treatment for masonry and log walls is not generally available. However if a treatment for such walls becomes available in the future, it can be evaluated by the procedure on this page and the priority setting procedure on pages 23-24. If the R value attained is other than 15, that value should be used in the potential savings calculation.

a. For uninsulated frame walls, a total R value around 3.0 can be used, no matter what the type of surface treatment. However if the walls are of different construction, it may be necessary to determine the R value. From Table 1 on page 22 of the Job Book, obtain the R value for each material in the walls. Add these R values to obtain a composite value for the walls. Round off to nearest tenth of unit.

b. Enter perimeter and height of outside walls from pages 15-16. Multiply to obtain gross wall area. Subtract the sum of areas of windows and doors, from pages 15 and 16, to determine net wall area.

c. Determine the heating units now required due to losses through the walls.

d. In a similar manner determine the heating units which would be required if the walls were insulated to R-15.

e. Subtract to determine the potential heating savings and enter at the bottom of the page.

(6) Heat Losses by Conduction and Infiltration through Single Glass Windows (page 21)

Very often a significant infiltration loss occurs around windows in addition to the losses by conduction through the glass. Adding storm windows can significantly reduce infiltration losses as well as conduction losses. It is important to allow for this when the benefits of storm windows are being considered relative to other possible measures.

a. Use the sketches, on pages 15 and 16, to fill in the table to determine the total area of single glass windows.

b. Determine the heating units required for conduction losses through the windows (based on R-1 for the windows).

c. Determine the potential saving by adding storm windows. The calculation allows for the storm windows saving half the conduction loss plus a saving of infiltration heat loss equivalent to one quarter of the loss through single glass.

d. Subtract to determine the potential heating savings and enter at the bottom of the page.

(7) Summary Table for Priority Rating of Weatherization Measures (pages 23 and 24)

This table allows the relative costs and savings for various possible weatherization measures to be compared. The most cost-effective measures can then be determined:

a. Enter the potential heating savings from the boxes at the bottom of pages 17 to 22 on the appropriate line in column 5.

b. Estimate the cost of materials for each possible weatherization measure in Column 1, entering the unit cost (cost/ft^2 or other unit) of the materials on which the estimate is based. The unit cost should be an approximation of the average cost across the geographical area covered by the building type.

c. Enter the installation factor for each measure in Column 2. The installation factor is equal to the total cost (installation and material) of the measure installed divided by the material cost. Installation cost includes on-site labor and equipment rental. Standard reference guides which list installation costs can be used. The installation factor allows for the additional cost of installing the materials so a true cost of the weatherization measure can be obtained.

d. Multiply the total material cost by the installation factor for each weatherization measure to find Total Cost and enter in Column 3.

e. Enter the expected life of each proposed weatherization measure in Column 4 and enter the cost per heating unit for the fuel actually being used (from page 16) in Column 6. Then determine the lifetime savings due to each proposed weatherization measure by multiplying the figure in Column 4 by the figure in Column 5 and the product by the figure in Column 6. Enter the answers in Column 7.

f. The Cost:Benefit ratio for each weatherization measure is then calculated by dividing the figure in Column 3 (total cost of measure) by the figure in Column 7 (savings due to the measure) and is entered in Column 8.

g. Rank the cost-effectiveness of all the weatherization measures by comparing the figures for Cost:Benefit Ratio saved. Reducing general heat waste is always regarded as cost effective and is already entered as No. 1 in Column 9. The weatherization measure calculated in column 8 to have the lowest Cost:Benefit ratio (i.e. to cost the least per heating unit saved) is then entered as No. 2 in column 9. The next least costly measure is No. 3, and so on. Any measure which has a Cost:Benefit ratio exceeding 1.0 will probably cost more than it saves over its lifetime and should be evaluated very carefully at the local level before being included on the Recommended List.

(8) Recommended Weatherization Priority List (page 24)

Transfer the information on source of heat loss, appropriate weatherization measures and unit material costs for cost-effective measures in priority order from the Summary Table onto the Recommended Weatherization Priority List on the lower half of page 24. Enter the building type and area covered (e.g. statewide or subarea by name) in the appropriate spaces.

(9) Calculation of priority ranking by category

a. The State will use the Recommended Weatherization Priority List for inclusion in the State Plan. The State is to combine the ranking from the sample buildings in each category and enter the final ranking into a "Recommended Weatherization Priority List." If the rankings differ between sample buildings, the State should recheck the discrepancies. Where discrepancies remain, the State should take reasonable steps to resolve them. The State should attach to the list a brief explanation of how the final ranking was derived.

b. Enter the type of building and geographical area covered by the type in the appropriate spaces.

c. Some measures may be impossible to implement because of local conditions. For example, carrying out certain measures may violate State law. Any of the considered measures which are suitable for the local situation should be checked in the last column of the Recommended Weatherization Priority List. A notation of the reason for exclusion, e.g. "not cost-effective" or "unsuitable" should be made for any measure which is to be omitted from the Retrotech Building Check and Job Order Sheet.

d. The State may use the previous year's analysis of sample dwelling units, but it should update the data on R values, material costs, etc. and re-validate the priority list.

e. A weatherization measure not included in the Job Book but eligible for purchase with program funds and appropriate to an area can be evaluated on separate pages. Prior approval by DOE is not required for inclusion of such a measure in the list submitted to DOE as part of the State plan.

(5) Publication and issuance of Building Check and Job Order Sheet

a. After approval of the priority ranking by DOE, the State shall enter a copy of the "Recommended Weatherization Priority List" into the space provided on the form. It provides the rationale for the work done on each dwelling and indicates the source of the evaluation.

The sheet can be used intact or individual blocks may be pasted up to provide a "camera ready" form for duplication, which covers the pre-selected weatherization measures. If a specific measure in a block is not to be undertaken, it may be omitted from the duplicated form.

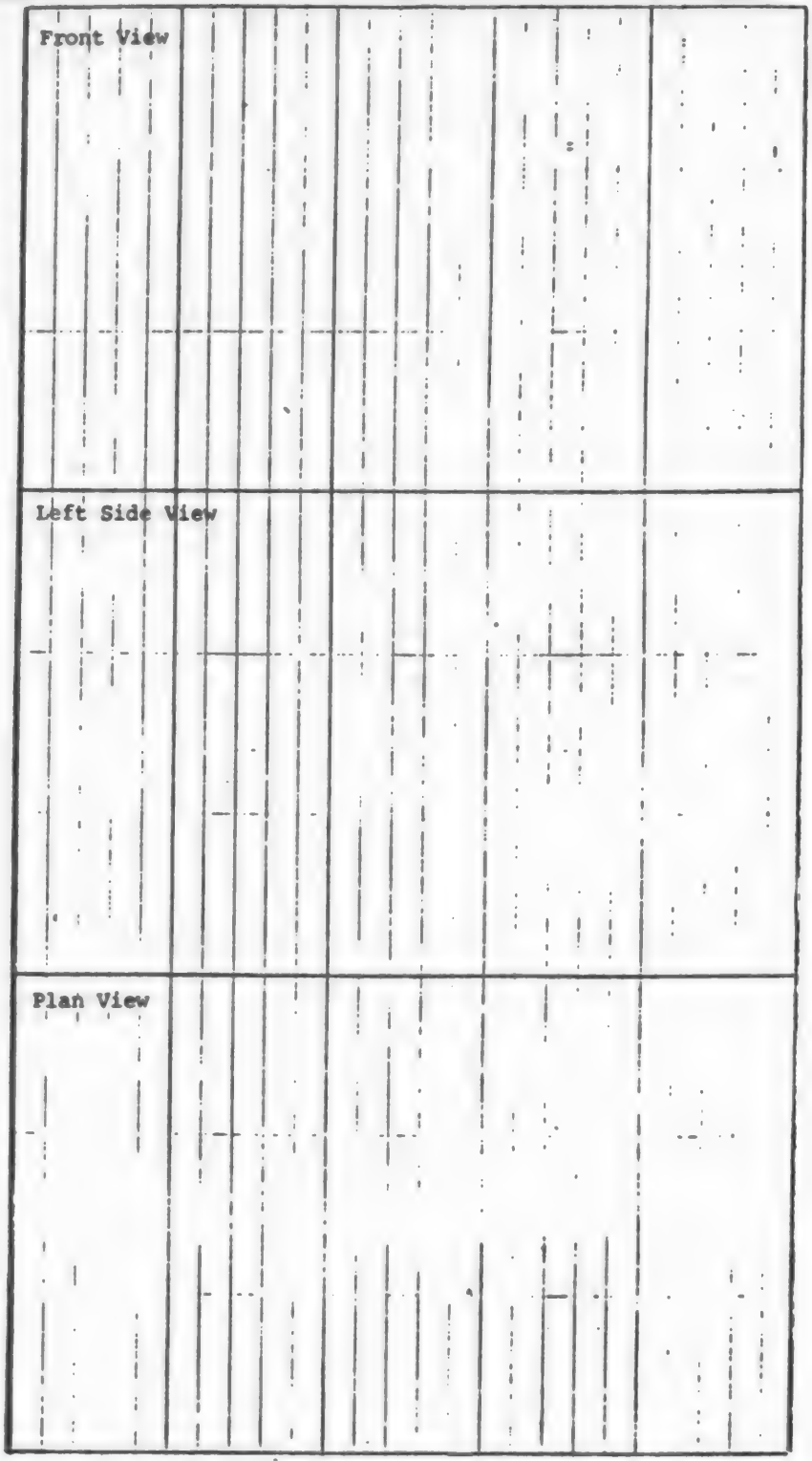
b. The State shall clearly indicate on the first page the type of building (to include a brief description) and the geographical area covered by the category.

c. The State shall reproduce the Building Check and Job Order Sheet, as completed for (a) and (b) above, and make it, along with copies of the Job Book, available to program operators.

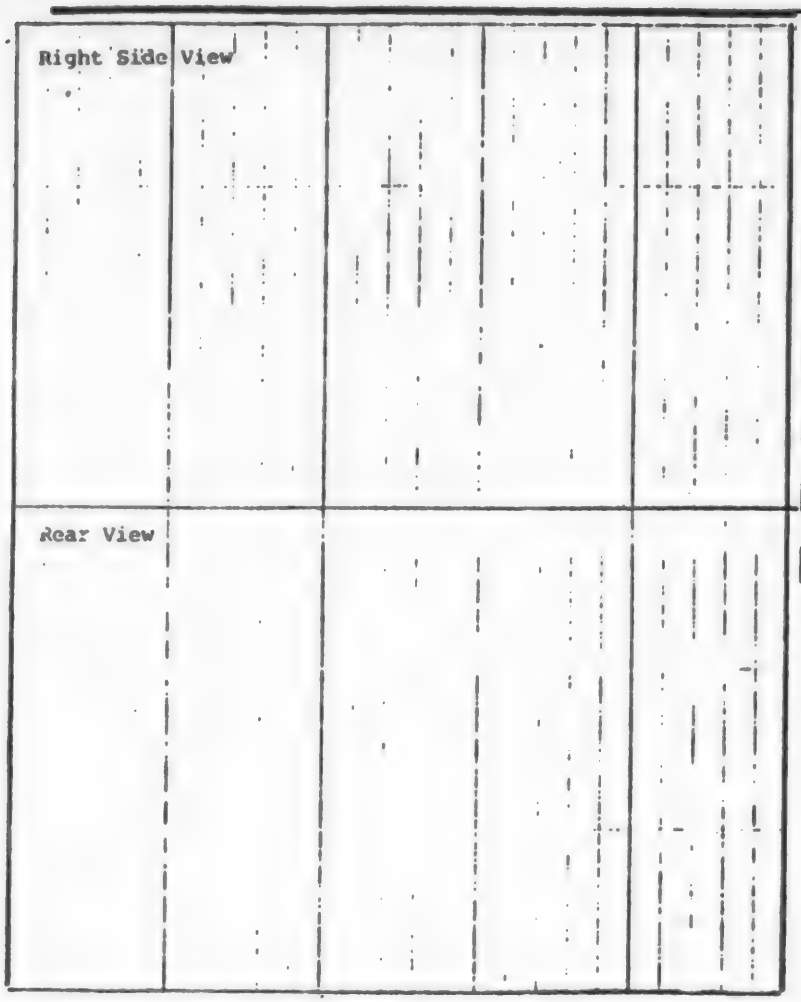
DESCRIPTION OF BUILDING

Sketch all views and put dimensions on each part shown, for example, length of walls, width and length of windows, etc. Label all single glass windows S and double glass and doors D. Complete all items in the job book labeled "Fill in at Job Site."

FILL IN AT JOB SITE



These grids are provided as guides for lines. Drawings need not be done to scale.



FUEL USED IN THIS BUILDING			COST PER HEATING UNIT ($)
☐	Oil ____ ($ per gallon)	x 1 =	
☐	Natural Gas ____ ($ per therm)	x 1.2 =	
	OR		
☐	Natural Gas ____ ($ per cu ft)	x 120 =	
☐	Propane ____ ($ per lb)	x 6 =	
☐	Electricity ____ ($ per kwh)	x 30 =	
☐	Coal ____ ($ per ton)	x .005 =	
☐	Wood ____ ($ per cord)	x .007 =	

Do not complete this list when evaluation is for a typical building.

Dwelling Unit Information

Name of Head of Household

Name and Address of Owner: (if not the same as above)

Number of Occupants ____

Age and Style of Building

Type of Fuel Used

Primary ____ Secondary ____

Type of Heating System

Type of Domestic Hot Water Heater

Winter Thermostat Setting

____ °F Day ____ °F Night

Amount of Fuel Used Last Winter ____

Calculation of Floor Area

If the building is not rectangular or square add the areas of the various parts together to find the floor area

Building Length ft.	Building Width ft.		Floor Area sq. ft.
		+	
		+	

District Heating Factor ☐

Area of Ceiling
(Take area of upstairs ceiling in a two-story house)

Ceiling area will normally be the same as floor area (from building description sheet)

Always include the materials in the roof deck in addition to the materials in the actual ceiling.

Material	Thickness (inches)	R Value
Inside surface	—	0.68
Outside surface (0.7)	—	.17
	Total R value	

HEAT LOSSES BY CONDUCTION THROUGH UNINSULATED CEILINGS

FILL IN AT JOB SITE

[ ] Ceiling area sq.ft. X [ ] District heating factor + [ ] Total R value = [ ] Heating units required

Potential Savings by Insulation of Ceilings

The appropriate amount of insulation for a ceiling depends on climate, fuel prices and insulation costs. Check the current DOE recommendations on maximum appropriate R value for your area. This indicates the maximum amount of insulation which is cost effective for your climate at current prices. Any less amount of insulation than this will save less total fuel but will save more per dollar spent.

[ ] Ceiling area sq.ft. X [ ] District heating factor + [ ] Appropriate R value = [ ] Potential heating units

Subtract the potential heating units from those now required and enter here →

Type of Heat Loss	Potential Heating Savings
Conduction Through Uninsulated Ceilings	

Area of Ceiling
(Take area of upstairs ceiling in a two-story house)

Ceiling area will normally be the same as floor area (from building description sheet)

HEAT LOSSES BY CONDUCTION THROUGH PARTIALLY INSULATED CEILINGS

If ceilings are partially insulated, e.g. to no more than R=10, further savings can be made by adding insulation. However the primary savings have already been made and the investment in extra insulation may not be as worthwhile as some other measures. Evaluate the savings by the calculations below, using R=10 for a sample building or actual R value for an individual case.

Probable Heat Loss through Partially Insulated Ceilings

	X		+		=	
Ceiling area sq.ft.		District heating factor		Total R value (Use R=10 for sample houses)		Heating units required

Potential Savings by Additional Insulation of Ceilings

The appropriate amount of insulation for a ceiling depends on climate, fuel prices and insulation costs. Check the current DOE recommendations on maximum appropriate R value for your area. This indicates the maximum amount of insulation which is cost effective for your climate at current prices. Any less amount of insulation than this will save less total fuel but will save more per dollar spent.

	X		+		=	
Ceiling area sq.ft.		District heating factor		Appropriate R value		Potential heating units

Subtract the potential heating units from those now required and enter here →

Type of Heat Loss	Potential Heating Savings
Conduction Through Partially Insulated Ceilings	

HEAT LOSSES BY CONDUCTION THROUGH FLOORS

Do not complete this page for concrete slab floors. Heat loss due to them is usually small but cannot be evaluated by this method

FILL IN AT JOB SITE

Floor Exposure Factor

Select the appropriate factor from the descriptions below:

Building on posts or pillars with no perimeter protection	1.0
Building on posts or rocks with some protection against wind blowing under building	.8
Tight skirt or foundation wall around perimeter and less than two feet of wall or skirt exposed above grade	.5
Tight foundation wall with equivalent of R4 insulation on inside or outside of wall	.3

R value of floor

A typical uninsulated, uncarpeted wood floor will have an R value of about 3. Carpet and pad will increase the R value to 5.

[ ] X [ ] X [ ] ÷ [ ] = [ ]

Floor area (from building description) sq.ft. | Floor exposure factor | District heating factor | Floor R value from above | Heating Units Required

Potential Savings on Heat Loss through Floors

1. Reducing below floor drafts

Unless vigorous underfloor ventilation is needed to remove moisture rising from the ground, a floor should be protected from drafts, so that it has a floor exposure factor of only 0.5. If the floor in this building has an unexposure factor over 0.5, cutting out drafts below the floor could reduce the heat loss to:

[ ] X [0.5] X [ ] ÷ [ ] = [ ]

Floor area from above sq. ft. | Floor exposure factor | District heating factor | Floor R value from above | Potential heating units

2. Adding Insulation

EITHER (a) The perimeter wall of the crawl space or basement can be insulated (with R=4 or better) down to grade level or just below, to cut both drafts and conduction losses, reducing the floor exposure factor to 0.3. The heat loss with an insulated perimeter would be approximately:

[ ] X [0.3] X [ ] ÷ [ ] = [ ]

Floor area from above sq. ft. | Floor exposure factor | District heating factor | Floor R value from above | Potential heating units

OR (b) Where perimeter walls cannot be insulated because the insulation would become wet (if water seeps through the basement walls or if water rises above the level of the insulation or if underfloor ventilation is needed) the whole floor may be insulated instead of the perimeter. This is usually more expensive than perimeter insulation but can give extra savings. Insulating this floor with a minimum of 3 1/2" fiberglass between the joists will increase the R value to 15. More insulation will increase the R value further still. The potential heating units will be:

[ ] X [ ] X [ ] ÷ [ ] = [ ]

Floor area from above sq.ft. | Floor exposure factor (Use 0.5 if drafts can be eliminated. Use 0.8 if underfloor ventilation is needed) | District heating factor | Floor R value (minimum of 15) | Potential heating units with whole floor insulation

Subtract the potential heating units for any of the three possible floor treatments which are feasible from the heating units now required and enter in the boxes below.

1 [ ] Potential heating savings by reducing drafts

2a [ ] Potential heating savings by Perimeter Insulation

2b [ ] Potential heating savings by whole floor insulation

HEAT LOSSES BY CONDUCTION THROUGH UNINSULATED WALLS

(Partially insulated frame walls cannot normally be further insulated.)

FILL IN AT JOB SITE

R Value of Outside Walls

Uninsulated frame walls usually have a total R value around 3.0 no matter what type of interior finish or siding treatment is present. If the wall is of different construction list all materials in the wall in the table at right, starting from inside and including air spaces within the wall. Insert R value for each component from Table 1.

Material	Thickness (inches)	R Value
Interior surface	—	0.68
Outside surface	—	.17
	Total R value	

[ ] Total perimeter of outside wall ft. x [ ] Total height of outside wall ft. = [ ] Gross wall area sq.ft

[ ] Gross wall area sq.ft − [ ] Total area of all windows and doors from sketches on pages 2 and 3 = [ ] Net wall area sq.ft.

[ ] Net wall area x [ ] District heating factor + [ ] Total R Value = [ ] Heating units required

Potential Savings by Insulation

Well-insulated walls should have an R value of 15. If this were so for this building, the wall heat loss would be

[ ] Net wall area (from box above) x [ ] District heating factor + [15] R value = [ ] Potential heating units

Subtract the potential heating units from those now required and enter here →

Type of Heat Loss	Potential Heating Savings
Conduction Through Uninsulated Walls	

HEAT LOSSES BY CONDUCTION AND INFILTRATION THROUGH SINGLE-GLASS WINDOWS

Area of Single Glass Windows:
(Assuming R = 1 for single glass)

Width	x	Height	x	Number	=	Area
				Total sq.ft.		

Total sq.ft.	x	District heating factor	=	Heating units required

Potential Saving by Adding Storm Windows

Adding storm windows will cut the conduction heat loss by half and will probably save half again by reducing infiltration. i.e. cut heat loss to 25%. Calculate the potential heating units below.

Heating units now required with single glass	x .25 =	Potential Heating Units

Subtract the potential heating units from those now required and enter here →

Type of Heat Loss	Potential Heating Savings
Conduction and Infiltration Through Single Glass Windows	

Table 1: Insulation Value of Common Materials

This list is not intended to include all types of building materials, but only materials commonly used in residences. If necessary, select the material most similar, and the resulting values will not substantially affect the calculation.

MATERIAL	THICKNESS (inches)	R VALUE
Air Film and Spaces:		
Air space, bounded by ordinary materials	¾ or more	.91
Air space, bounded by aluminum foil	¾ or more	2.17
Exterior surface resistance	—	.17
Interior surface resistance	—	.68
Masonry:		
Sand and gravel concrete block	8	1.11
	12	1.28
Lightweight concrete block	8	2.00
	12	2.13
Face brick	4	.44
Concrete cast in place	8	.64
Building Materials — General:		
Wood sheathing or subfloor	3/4	1.00
Fiber board insulating sheathing	3/4	2.10
Plywood	5/8	.79
	1/2	.63
	3/8	.47
Bevel-lapped siding	1/2 x 8	.81
	3/4 x 10	1.05
Vertical tongue and groove board	3/4	1.00
Drop siding	3/4	.94
Asbestos board	1/4	.13
3/8" gypsum lath and 3/8" plaster	3/4	.42
Gypsum board (sheet rock)	3/8	.32
Interior plywood panel	1/4	.31
Building paper	—	.06
Vapor barrier	—	.00
Wood shingles	—	.87
Asphalt shingles	—	.44
Linoleum	—	.08
Carpet with fiber pad	—	2.08
Hardwood floor	—	.71
Insulation Materials (mineral wool, glass wool, wood wool):		
Blanket or batts	1	3.70
	3 1/2	11.00
	6	19.00
Loose fill	1	3.33
Rigid insulation board (sheathing)	3/4	2.10
Windows and Doors:		
Single window	—	approx. 1.00
Double window	—	approx. 2.00
Exterior door	—	approx. 2.00

Source: ASHRAE Guide and Data Book.

SUMMARY TABLE FOR PRIORITY RATING OF WEATHERIZATION MEASURES

Fill out the Summary Table at the right by entering the fuel cost per Heating unit from p. 3 in Column 4, and the Potential Heating Savings from pp. 4-8 in Column 5. Enter the estimated material cost for the required changes in Column 1, the appropriate Installation factor in Column 2 and the expected life of each Weatherization measure in Column 4. From these figures determine the Total Cost and Lifetime Savings from each measure, and then in Column 8 calculate the Cost:Benefit Ratio. Finally, in column 9, rank the weatherization measures in order of cost effectiveness.

Source of Heat Loss	Weatherization Measure Required to Minimize Heat Loss	Unit Cost of Mat'l ($/ft^2)	Quantity of Material (sq.ft.)	1 Total Material Cost (Unit Cost x Quantity) ($)
General Waste of Heat	See separate Job Order Sheet			
Uninsulated Ceilings (from p.4)	Insulate to Local Standard of R =			
Partially Insulated Ceilings (from p.5)	Insulate to Local Standard of R =			
Exposed Floors (from block 1 page 6)	Reduce Exposure factor to 0.5			
* Uninsulated Perimeter (from block 2a page 6)	Insulate perimeter with R=4 or better			
* Uninsulated floors (from block 2b page 6)	Insulate floor with R=11 or better			
Uninsulated Walls (from p. 7)	Insulate Wall to R = 15			
Single Glass Windows (from p.8)	Add Glass Storm Windows			
	Other:			

*Only one of these alternate measures is applied to a specific building. See weatherization manual for details.

RECOMMENDED WEATHERIZATION PRIORITY LIST

Enter the various sources of heat loss and appropriate weatherization measures from the Summary Table above in priority order in the list at right. This is the order of importance of weatherization measures in a building of the type examined regardless of size or age. A copy of this list should be included in the local Building Check and Job Order Sheet for this type of building.

2 Installation Factor (Allows for Labor Cost to install)	3 $ Total Cost (Col 1 x Col 2)	4 Expected Life of Weatherization Measure (years) OR or Expected Life of Bldg., whichever is least	5 Potential Heat Savings from bottom of pages 4-8 (Heating Units/year)	6 Fuel Cost per Heating Unit (from page 3) ($/HU)	7 Lifetime Savings due to Weatherization Measure (Col 4 x Col 5 x Col 6) ($)	8 Cost:Benefit Ratio (Col 3 ÷ Col 7) ($)	9 Order of Cost Effectiveness
	Usually Small		Usually Substantial			Usually Favorable	1

RECOMMENDED WEATHERIZATION PRIORITY LIST

for _____ in _____ by Job Book Reference No. _____
(building/type) area/address

PRIORITY	SOURCE OF HEAT LOSS	WEATHERIZATION MEASURE REQUIRED	Approx. Allowable Unit Cost of Materials	If list is for a Typical Building check if item is included on Job Order Sheet or note reason for omission
1	General Heat Waste	See Job Sheet	---	
2				
3				
4				
5				
6				
7				
8				
9				

DISTRICT HEATING FACTOR FOR THE UNITED STATES

PART II Use of Building Check and Job Order Sheet by Program Operator

The Building Check and Job Order Sheet provides basic ordering and control information for the various weatherization jobs which may be performed on a building. Each section of the sheet is designed to allow the person checking the building to determine which of the ranked measures are feasible for that particular building and to develop ordering information and work instructions for the installation crew.

A. Use of State ranking

(1) Take a Building Check and Job Order Sheet, with State ranking information provided on the first page, appropriate for the type of dwelling unit to be weatherized and for the geographical area.

(2) Conduct an inspection of the building to determine which measures are applicable to the dwelling unit.

(3) Enter the estimated quantity of materials and cost in the spaces provided.

(4) Determine which measures can be installed within the cost guidelines of the program as provided by the State. Priority will be given to measures which reduce general heat waste.

(5) The Sheet can be used as an ordering form.

(6) Enter the actual expenditures for measures installed.

(7) File the completed Sheet in the appropriate client file

B. Alternative procedure

The program operator can elect to evaluate the dwelling unit instead of using the State priority ranking of weatherization measures. This will typically occur where the dwelling unit does not fit any of the State building types or where the use of a type's ranking would result in an inappropriate set of measures. If the program operator uses this alternative procedure, the following steps will be used:

(1) Conduct an evaluation of the dwelling unit using the Job Book calculation procedure and instructions found in Part I of the Job Book.

(2) Since Part I instructions were written for State use for calculating ranking by types, the program operator should use the following special instructions where appropriate.

a. Fill out the form only for the dwelling unit to be weatherized.

b. In the Description of Building Table use current fuel prices for the specific dwelling unit or geographic area.

c. In the Description of Building Table complete the dwelling unit information consisting of name and address of owner, type of fuel used, etc.

d. In the Summary Table use unit cost of material based upon local prices of such materials.

e. In the Summary Table use either the State installation factors from the type of buildings most similar to the dwelling unit or estimate the factors using local data on on-site labor and rental equipment costs.

f. Calculate either "Heat Losses by Conduction through Uninsulated Ceilings" or "Heat Losses by Conduction through Partially Insulated Ceilings" whichever is appropriate to the dwelling unit. If using the partially uninsulated table, calculate the actual Total R value instead of using the value "10".

(3) Place the ranked measure on the first page of the Building Check and Job Order Sheet.

(4) Complete the Building Check and Job Order Sheet in accordance with Part II A instructions of this document.

D.O.E. Weatherization Program
RETROTECH BUILDING CHECK AND JOB ORDER SHEET

Each block on this sheet provides basic ordering and control information for the various weatherization jobs on a building. The sheet can be used intact, or individual blocks may be pasted up to provide a "camera ready" form for duplication, which covers the specific weatherization measures agreed between the D.O.E. Regional Office and the State for a particular building type in an area. If a specific measure in a block is not to be undertaken, e.g. repairing hot water faucets, it may be omitted from the duplicated form.

During inspection of building, cross out any item which does not apply or is already weatherized. Fill in appropriate instruction for jobs to be done.

JOB PHONE #	INTAKE / /
NAME	ESTIMATE /
	APPROVED /
ADDRESS	WINDOWS ORDERED /
	WINDOWS RECEIVED /
DIRECTIONS AND SPECIAL PROBLEMS	STARTED /
	COMPLETED / /
	Total Materials $_____ Cost (from p4)

JOB ORDERS	Estimated Quantity	Estimated Cost ($)	Actual Quantity	Actual Cost
GENERAL HEAT WASTE				
Can INFILTRATION be reduced? Replace broken glass in _____ Reset glass in _____ Replace threshold in _____ Pack cracks in _____ Weatherstrip windows in _____ (not if storm windows to _____ be installed?) Caulk windows in _____ Weatherstrip doors in _____ Caulk doors in _____ Install door sweeps in _____ Weatherstrip attic hatch _____ Repair fireplace dampers in _____ Close off fireplace in _____				
Do HOT-AIR DUCTS pass through cold areas? Insulate ducts leading to _____				
OBTAIN SPECIFIC PERMISSION OF OCCUPANT FOR EACH OF THE FOLLOWING OPTIONAL MEASURES	X	X	X	X
Can DOMESTIC HOT WATER SYSTEM be made more efficient? Should HOT WATER HEATER temperature be reduced? Turn setting down to ___°F Can ELECTRIC HOT WATER HEATER be insulated? Insulate with R _____				
Can CONTROL of heating system be improved? Turn thermostat down to ___°F (explain benefit to client) Install night setback thermostat _____ Relocate thermostat to _____ Can any UNUSED ROOMS be CLOSED off? (remember water pipes may freeze in closed off rooms) Close off heating to _____				
Totals Carried forward → to page 4.				

JOB ORDERS	Estimated Quantity	Estimated Cost($)	Actual Quantity	Actual Cost

STORM WINDOWS

FIRST FLOOR

#	width x height	no.	cost
1.	x		$
2.	x		$
3.	x		$
4.	x		$
5.	x		$
6.	x		$
7.	x		$
8.	x		$

SECOND FLOOR

#	width x height	no.	cost
1.	x		$
2.	x		$
3.	x		$
4.	x		$
5.	x		$
6.	x		$
7.	x		$
8.	x		$

OTHER

#	width x height	no.	cost
1.	x		$
2.	x		$
3.	x		$
4.	x		$

#	width x height	no.	cost
5.	x		$
6.	x		$
7.	x		$
8.	x		$

Total Costs

FLOORS

Can FLOOR EXPOSURE be reduced?
Skirt crawl space with _____
Insulate perimeter with _____
(does perimeter insulation need to be waterproof?)
Should FLOOR INSULATION be installed?
Insulate floor with _____

CEILINGS

What is the R VALUE of the EXISTING ceiling? ___
(if existing R is over ___ no further insulation is to be added)
What INSULATION should be added?
Insulate with _____, _____inches

Joist Spacing _____inches	Ceiling Area
	___ x ___
	___ x ___
	___ x ___

Is ATTIC VENTING needed?
Install _____ vents in _____
(size) (location)

WALLS

Should WALLS be INSULATED? Are spaces accessible?
(Remember possible moisture problems with frame walls insulated without a vapor barrier)
Insulate wall in _____ with _____
_____ with _____
_____ with _____
(room) (material)

Totals Carried forward to page 4 →

JOB ORDERS	Estimated Quantity	Estimated Cost ($)	Actual Quantity	Actual Cost
ADDITIONAL NECESSARY REPAIRS				
Are any repairs necessary to protect or supplement the weatherization measures? List:				
MECHANICAL OPTIONS				
Are FURNACE EFFICIENCY MODIFICATIONS possible? List: _____ _____ _____ Other:				
$ Totals →				
Brought forward from p2 →				
Brought forward from p3 →				
		Total Est. Cost		Total Actual Cost

BILLING CODE 6450-01-C

Provisions of 10 CFR Part 440 are amended as follows:

§ 440.2 [Amended]

1. Section 440.2(a) is amended to redesignate subparagraph (8) as subparagraph (9) and add a new subparagraph (8) as follows:

(a) * * *

(8) DOE Assistance Regulations (10 CFR 600); and

* * * * *

§ 440.14 [Amended]

2. Section 440.14(b) is amended to add a new subparagraph (3) to read as follows:

* * * * *

(b) * * *

(3) the approach, including a list of measures to weatherize a dwelling unit, developed by the State in accordance with Project Retro-Tech, [cite], which shall be applied to each dwelling unit by a subgrantee to determine the optimum set of cost-effective measures, within the allowable expenditures prescribed in § 440.16, to be installed in such dwelling unit.

* * * * *

§ 440.15 [Amended]

3. Section 440.15(a) is amended to add a new subparagraph (8) to read as follows:

(a) * * *

(8) the list of measures to weatherize a dwelling unit, developed by the State in accordance with § 440.14(b)(3), after approval by the Regional Representative, is included in copies of Project Retro-Tech which are furnished by the State to subgrantees.

* * * * *

§ 420.7 [Amended]

4. Section 420.7 (c) and (d) is amended to read as follows:

* * * * *

(c) A weatherization project shall utilize the approaches to weatherization contained in Project Retro-Tech, [cite] including the energy conservation techniques therein.

(d) In considering a request made pursuant to paragraph (b) of this section, DOE shall—

(1) Evaluate the extent to which the request is designed to achieve a balance of healthful dwelling environment and maximum practicable energy conservation; and

(2) When appropriate, coordinate evaluation through DOE with the Secretary of Housing and Urban Development, the Secretary of Health, Education, and Welfare, and the Director of the National Bureau of Standards in the Department of Commerce.

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